PART 8

UTILITIES MANAGEMENT

TABLE OF CONTENTS

CHAPTER 1 - INTRODUCTION

1-1 OVERVIEW

A. Utility systems play an extremely vital role in the everyday functioning of a health care installation. It is therefore imperative that Indian Health Service (IHS) installations; control, maintain, and monitor the performance of their utility systems to reduce the risk of patient injury during normal equipment operation and during any period of utility equipment malfunction or failure. The intent of establishing a utilities management program is to institutionalize a program that will assure operational reliability and response to failure of critical utility systems in the support of the patient care environment. This program intends to provide a management system for utilities that are critical to the operation of some departments.

B. Usually take utilities are taken for granted. However, without them health care installations could not perform the functions necessary to conduct their mission. It is therefore imperative that a well functioning utility management program exist at each installation.

A utilities management program is essential to:

(1) Assure accreditation

(2) Manage support for health care delivery

(3) Practice good engineering

C. The majority of utilities are supplied by outside sources. The distribution of the utilities within our grounds and buildings however, is the responsibility of the Facilities Manager. Regardless of the source of a utility, installations must have plans that clearly outline the response of each affected department when critical utilities fail. Every installation must therefore implement a program designed to assure the operational reliability, assess risks, and respond to failure of utilities that support the patient care environment. Failure of some utilities require facilities and clinical staff intervention. Staff is generally alerted to utility failure by alarm systems that inform the staff of impending problems.

D. Some utilities such as the electrical distribution system (emergency power) and medical gases have an automatic back up system. Other utility systems however, do not possess such flexibility. Steam, ventilation, heating, air conditioning, potable water, plumbing and others do not have backup systems that will respond when the system fails. Every installation will occasionally encounter the need to shut down utilities from time to time for scheduled maintenance, repairs or remodeling. Some

equipment requires that utility service be primed before start up because the utility may have drained during shut down. Failure to consider this could damage or possibly destroy the equipment. Some equipment that requires resetting or restarting should be documented as part of the required action to start up the utility after failure or shut down.

E. A recovery plan is therefore necessary to start up the utility, safely, promptly and effectively after it has been shut down. How smoothly the process works depends enormously on the thoroughness of the written procedures that are developed to carry out the start up and the shut down. Therefore, a very detailed analysis of every utility is needed to ensure that all aspects of are taken into consideration.

1-2 PURPOSE

A. The purpose of this guideline is to assist Facilities Managers in developing, establishing and implementing a comprehensive utilities management program.

A management program is required for two reasons:

(1) MANDATED- To assure that utility systems are available in proper working order when needed to deliver or support the medical care mission. Required maintenance and inspections carried out under the program are intended to minimize the risk of failure of systems and equipment used to directly support health care.

(2) ECONOMIC - To extend the useful life of utility systems and their ancillary equipment. The implementation of a utilities management program is intended to preserve the considerable investment made by the government in facilities on behalf of Native Americans and Alaskan Natives. Maintenance of equipment extends its useful life, therefore minimizing interruptions and the reduction of the resulting additional costs when a critical utility systems or its ancillary equipment is not operational.

1-3 POLICY

The physical risks of operating and using critical utility systems at each installation will be controlled through program functions that identify, maintain, train, evaluate, and resolve problems. These functions are a service unit wide multi-disciplinary responsibility that must be carried out by all affected department heads and their respective subordinate personnel as part of their daily responsibilities.

1-4 APPLICABLE EQUIPMENT

When the word equipment is used in this document it specifically implies real property equipment (building service equipment) which is part of a utility system.

Other types of equipment are covered as outlined below:

A. Clinical Personal Property Equipment - This equipment is normally referred to as patient care equipment. An equipment management program for this type of equipment is covered in this Technical Handbook series under Volume V, Clinical Engineering.

B. Non-Clinical Personal Property Equipment - An equipment management program for this type of equipment that is under the responsibility of facilities engineering is covered in the Facilities Engineering Operations Manual, Part 11, Equipment Management.

C. Other Equipment - Any other equipment (i.e. computers, telephones) is not included above because it is not the responsibility of facilities engineering. Accreditation and good engineering practice require that it also be covered under the responsible department's equipment program.

1-5 DESIGNATED UTILITIES

A. Utility systems in IHS include the following:

- Electrical System
- Emergency Electrical Power System
- Vertical Transportation (Elevators)
- Heating, Ventilating, and Air Conditioning System
- Plumbing System
- Steam/Hot Water System
- Medical Gas Systems
- Medical/Surgical Vacuum System
- Communications Systems (Data, Phone, Paging, Nurse Call)

NOTE: Data and phone systems are not generally the responsibility of facilities engineering therefore they are not covered in this document.

B. It is therefore imperative that the installation safety committee identify, which are the systems or sections of the systems that

are critical for the operation of the installation. The utility management program will then be developed by the Facilities Manager around those systems identified by the committee. This will allow limited resources to be concentrated on those systems critical to the operation of the installation.

CHAPTER 2 - ESTABLISHING A MANAGEMENT PROGRAM

2-1 REQUIREMENTS

A. GENERAL

The utilities management program for each installation is generally unique to each site because each installation's interrelationship of organizational elements is unique. In IHS the minimum acceptable requirements for a utilities management program are those that will satisfy accreditation and maximize the government's investment.

B. GUIDELINES

The following guidelines will establish a utility management program at IHS installation:

(1) A current, accurate unique written inventory of each separate system and its ancillary components will be maintained for each utility system. The depth of the inventory will include each critical component from the point the facility assumes responsibility from the utility company to the user end.

(2) All newly installed additional or replacement utility system and system components will be evaluated within 30 days of installation and be either included or excluded from the program.

(3) Recurring training will be given to ensure that staff who operate and/or maintain critical utility systems are thoroughly knowledgeable in the operation, maintenance and failure response of the designated systems.

(4) Utility inventory listings must be separate or separable from other inventories (e.g., personal property PM inventory, CMR inventory, clinical equipment PM inventory).

(5) The accuracy of the utility system inventory must be verified and documented in writing to the installation safety committee at intervals not to exceed one year.

(6) Each critical utility system in the program must be inspected at intervals not to exceed one year.

(7) Each item in the inventory must have written PM guidelines, testing and inspecting procedures as recommended by the manufacturer and/or codes.

(8) Evidence of PM, tests and inspections must be documented and maintained on file.

(9) All repairs to critical system components must be logged in each respective equipment record card.

(10) Significant reportable system failures and user errors must be evaluated and corrective follow-up actions monitored. A written report will be forwarded for approval by the installation safety committee.

(11) The installation safety committee will be the final authority in matters pertaining to changes in the program.

(12) A comprehensive effectiveness evaluation of the entire program will be conducted annually and a written report forwarded for concurrence by the installation safety committee and approval of the Governing Body.

(13) Utility system or sections of a system that are excluded from the program will be reported in writing to the installation safety committee and the applicable user department.

2-2 PREVENTIVE MAINTENANCE

All items in the utilities management program must be included in the PM program. Recommended criteria to determine inclusion or exclusion of equipment from a utilities management program is outlined in exhibit 2-3-A. See the Facilities Engineering Opeartions Manual, Part 4, Preventive Maintenance for the development of a comprehensive PM program.

A. TESTING AND INSPECTING PARAMETERS - Written procedures for testing, inspecting, calibrating and maintaining each components in each utility system are included in the program.

This includes at a minimum:

- What will be tested
- What intervals it will be tested and/or inspected
- What results will be considered acceptable.

NOTE: ***There are numerous sources for testing and maintenance guidelines including codes, standards, industry and trade periodicals, and manufacturer's technical manuals and literature. These guidelines may also specify or recommend maintenance and testing intervals, but actual frequency must often be developed by the Facilities Manager based on past historical system performance and risk failure. Testing and maintenance may be accomplished using in-house staff or by service contracts with qualified individuals or firms.***

B. DOCUMENTATION - Will be maintained on testing, inspections,

calibrations and corrective actions for compliance reviews by accreditation surveyors and IHS personnel.

It will include at a minimum:

- When the test/inspection took place.
- What the results were.
- Who conducted the test/inspection/calibration.
- If the test results were not acceptable, a written statement should specify the action required to correct the deficiency.
- Results of testing will be communicated to the departments that use the equipment or system. This may be accomplished through the service unit safety committee to avoid having to forward separate memoranda to each department.

2-3 EQUIPMENT EVALUATION

A. Installations are permitted to evaluate themselves, the risks associated with operation of the installation's utility equipment. An installations may either include all utility equipment in a management program or develop criteria that will assist in determining the equipment that will be included and/or excluded. This allows the installation to reduce the funding required to maintain all the equipment. This in turn allows concentrating the available funding on equipment that is vital to the operation of the health care programs.

B. Each installation that wants to reduce the quantity of equipment that will be included in the management program must therefore, develop written criteria for identifying risks to use as the basis for determining what will and what will not be maintained. Each individual type of equipment must be evaluated against the established criteria developed by the Facilities Manager and approved by the safety committee.

C. If equipment is to be evaluated for inclusion or exclusion it must be evaluated based on the following parameters:

(1) Risk Category I

Utility Support Functional Area - This risk category identifies the location where the equipment provides utility support at the installation.

(2) Risk Category II

Impact of Failure - This risk factor identifies the potential impact of the physical risks to patient or staff

if failure or malfunction occurs.

(3) Risk Category III

PM Frequency - This risk category identifies the PM frequency to keep system individual components in proper operating condition. Higher PM frequencies imply more critical components.

D. Each risk category includes specific criteria that is assigned weighted values . When the values are added together they yield a total score. This score is then used to determine if the utility component will be included or excluded from the utility management program.

(1) Equipment with a total scores twelve (12) or higher is included in the program and added to the PM inventory. Equipment with a total score of (12) or lower is excluded from the program.

(2) Equipment that scores of twelve (12) or lower may be included in the program at the discretion of the Facilities Manager.

(3) Equipment that scores twelve (12) or higher may only be excluded from the program by the installation safety committee.

The formula used to calculate the total score is:

Total Score = A + I + F

A = Area of Use
I = Impact of Failure
F = Frequency Of PM

2-4 EQUIPMENT INVENTORY

The following steps will assist a Facilities Manager in establishing the inventory for a utilities management program:

A. Identify all the Utility Systems at the Installation - Conduct a survey to identify all the applicable utility systems and ancillary components of each system, in each building. Utilize drawings and a physical survey to accurately accomplish this task.

B. Equipment Applicable to this Program - Generate a listing of components by utility and by building. Identify the listing as the utilities inventory.

C. Develop Risk Factors to Reduce the Inventory - The risk factors found in paragraph 2-3 of this document meet accreditation

requirements and establish the IHS methodology for evaluating utility equipment.

D. Develop Criteria to Evaluate the Inventory - Exhibit 2-3-A of this document is a checklist that meets accreditation requirements and establishes the IHS methodology for evaluating utility equipment.

E. Apply the Criteria to the Inventory - The scoring resulting from application of exhibit 2-3-A to each component in each utility will determine what equipment must be included in the utility management program. Identify this new listing as the utilities management inventory. Include all equipment in this listing in the PM program.

F. Determine the Inventory to be Contracted - An installation may not be able to accomplish maintenance of all the equipment in the program with its current in-house staffing. This may be due to the lack of technical skills by the existing facilities engineering staff, lack of testing equipment at the site and/or the lack of staff to accomplish the identified workload due to other program needs. Equipment that will be maintained by a contractor must still remain as an integral part of the utilities management inventory.

G. Determine the Inventory to be Accomplished In-House - The equipment remaining after the portion that will be contracted out is identified as the in-house utilities management inventory.

2-5 EQUIPMENT REPAIR HISTORY

A complete record of all repairs performed on the system equipment must be maintained in an automated or manual system for the life of each item of equipment. This repair history cost is utilized in the replacement justification when a recommendation for replacement is processed.

2-6 UPDATING THE INVENTORY

A. ADDITIONS - When a new piece of equipment is added to the program it is evaluated for inclusion or exclusion.

B. EDITING - When a change in the location of equipment is reported it is edited in the inventory.

C. DELETIONS - Equipment permanently removed from use (turn-in) must be removed from the equipment inventory. These changes may occur as a result of program changes, and excess or replacement due to construction.

2-7 REVIEW OF PURCHASE REQUISITIONS

Facilities Managers must evaluate all new additional or replacement utility equipment purchase requisitions prior to procurement. Adequate equipment information must be attached to the requisition to allow the review. If technical specifications are not included, the requisition must be returned to the facilities employee requesting the equipment.

The following items should be considered:

A. Determine if construction will be associated with installation of the equipment. If a construction project is needed for installation of the equipment develop a scope of work.

B. Determine the capability of existing space and utilities to support the requested equipment.

C. Review the equipment specifications to ensure that the requested equipment will meet all IHS safety specifications, such as proper grounding, and guards.

D. Determine if maintenance contract services will be needed to support the equipment. If contract services are required the cost must be researched and included in the FEPP Work Plan for the upcoming year.

E. Determine if any specialized test equipment, diagnostic software or hardware is needed to service or maintain the equipment with in-house staff. When necessary, specify accessories to be purchased. If required, the cost must be researched and added to the equipment purchase requisition.

F. Determine the need for technical manuals to service the equipment. If required, the cost must be researched and added to the equipment purchase requisition.

G. Determine if training associated with servicing the equipment by in-house personnel is needed. If needed, the availability and estimated cost of training must be researched and added to the purchase requisition.

H. Determine if the proposed equipment is compatible with other existing equipment at the installation and/or service unit. The parts currently stocked for other types of equipment, interchangeability of existing parts and the availability of service by an existing contractor needs to be considered. The goal should be to standardize equipment whenever possible.

I. If the requested equipment is a replacement item and a request for turn-in is attached, review the turn-in by verifying the repair history in the equipment card. The total cost of repairs for the equipment and the history for the repairs to date needs to be used as a verification that the equipment is justified for turn-in.

2-8 OPERATIONAL PLANS

Operational plans are descriptive narratives of each utility system developed to assist training of users and operators of the utilities. These plans are instrumental in failure response for current users, new employees and equipment operators. Narratives are required for each critical system whose failure would hamper the health care operation of a department.

Plans should include at a minimum:

A. OPERATION

Involves the basic operation of each utility system. The narrative should outline how the system operates following the system through each individual components, location of each component, and the system performance parameters. Explain how the system operates (what are the capacities, limitations, capabilities, where does the system originate, where does it terminate, what department or areas does each branch system serve).

B. MOBILIZATION

Involves the actions necessary to start up and shut down the system, who to contact in the event of failure, how to recognize what utility problems affect applicable departments, and what is the impact of system failures.

2-9 REFERENCE DOCUMENTS

A. DRAWINGS/SKETCHES

(1) Installations must maintain a current set documents for each utility. The drawings must indicate the distribution of the utility and controls for partial or complete shutdown of each utility system.

***NOTE:** When engineering drawings are used; color coding with colored pencils/markers is recommended to distinguish between different utilities if more than one system is shown per drawing and to distinguish between supply and return.*

(2) It is not required to have a separate document that indicates the distribution and shutdown controls for each utility. A collection of documents that contains this information, such as-built drawings, is acceptable. However, due to the many critical control locations of most utility systems, a simple and accurate one-line diagram or sketch is the best approach to provide mechanics, operators and users with a quick reference for use in emergency situations. Copies of these diagrams can be placed in appropriate mechanical rooms and other areas where

non-technical users have been properly trained. As-built drawings and riser diagrams should be kept more centrally located for use in troubleshooting and analysis.

B. LABELING OF CRITICAL SHUT OFF CONTROLS

(1) Emergency shut off controls must be labeled throughout the installation. A tag or label, of a material that is durable enough to maintain its integrity in the environment it is located, should identify its function (i.e. Oxygen - primary shutoff, B wing). If a chart is used to locate controls it should include at a minimum the location by room number or other clear indication where the component is located (i.e. Penthouse No.3/North wall left of air handler #3 or Room 5A-11, Left wall above suspended ceiling).

(2) Since utility installations generally occur through construction projects, labeling of shutoff controls should be accomplished at that time. For projects involving utilities, the Contracting Officer's Technical Representative, as part of his/her responsibilities as such, must ensure that the construction specifications are followed.

- Electrical specifications must clearly identify labeling requirements. The specification must outline compliance with the National Electric Code labeling requirements as well as additional identification signage which indicates information required for use and maintenance of items such as panelboards, cabinets, motor controllers (starters), safety switches, separately enclosed circuit breakers, individual breakers and controllers in switchgear and motor control assemblies, control devices and other significant electrical system components.

- Mechanical specifications must outline labeling requirements for temperature and humidity controllers, control dampers, and plumbing and heating, ventilation, and air conditioning (HVAC) valves.

(3) It is important that the users, as well as operators and facilities employees that maintain utility systems, know the location and operation of emergency shutoff controls. This applies to non-facilities personnel, such as nurses, security, etc., who may respond to utility emergencies prior to the arrival of a facilities employee on call-back.

- Each facility needs to determine the extent to which individual employees will be expected to act.

- Training must give the individual an understanding and realization of the effects of operating an emergency shutoff control. (What patient rooms will loose

oxygen if this shutoff valve is closed? What areas of this ward will lose hot water when this valve is closed?).

2-10 CONTINGENCY PLANS

Contingency plans are needed to define procedures to be followed during utility failure. This requirement will ensure that users and operators are sufficiently knowledgeable in performing their required duties during utility failure.

A. Accreditation requires that each department develop a written contingency plan on how their employees would respond in the performance of their mission during a utility disruption. It is essential to realize and accept that each department head bears responsibility for compliance with this standard in his/her respective jurisdiction. The departmental plans should outline employee response to the threat the occurrence could create on key patient care areas in the installation.

B. Well-written failure response plans serve as excellent documents from which to develop department-specific training. This is extremely important because of the complexity of most utility systems, and since utility systems are often interdependent and interactive with each other.

C. Plans should outline separate time intervals to accommodate the different actions that may be required at different times in the operation of the facility (administrative and non-administrative hours).

Basic elements to include are:

(1) Notification - Actions to be taken when a utility outage occurs during any of the following periods.

- Administrative Hours (_____ a.m. to _____ p.m. Monday through Friday)
- Non-Administrative Hours (_____ a.m. to _____ p.m. Monday through Friday and all day Saturday, Sunday and Holidays)

(2) Employee Course of Action - Provide a detailed description of the actions required by subordinate employees in maintaining direct or indirect patient care services during any type of utility outage.

- Actions need to define who, what, where, and whom
- Actions should always include alternate individuals to

contact.

(3) Return to Normal - Identify specific courses of action (if any) to be followed to return to normal service following a utility outage.

D. Contingency plans must be submitted to the service unit safety committee for approval.

2-11 PROGRAM PROCEDURES

A. The installation shall maintain written procedures that outline actions to be taken by the maintenance department to restore critical utilities, as determined by the installation safety committee, as a result of partial or total cessation of critical utilities that adversely affect patient care.

B. Each applicable administrative department, as determined by the installation safety committee, shall maintain written procedures outlining actions they shall take as a result of partial or total cessation of critical utilities that adversely affect patient care.

C. Each applicable clinical department, as determined by the installation safety committee, shall maintain written procedures outlining clinical interventions to be taken as a result of partial or total cessation of critical utilities that adversely affect patient care.

D. All departmental procedures shall be reviewed by the installation safety committee at least every three years.

2-12 UTILITIES FOR SMALL FACILITIES

A. It is not appropriate to expect that the extensive requirements for a utilities management program at a large installation be the same as those at a small one. In addition, some IHS programs operate out of space that is leased from a third party. In those cases IHS may not manage nor maintain the utilities. In order to establish criteria for determining between a small and a large installation the IHS criteria for distinguishing between business occupancy and health care can be utilized. Small health care facilities are defined by IHS as those with less than 10,000 gross square feet. Large facilities are those greater than 10,000 gross square feet. Applying this criteria a Facilities Manager can determine the magnitude of the utilities management plan that needs to be developed for each installation.

B. It is expected that a small installation will inspect, test, and maintain the utility segments under its control. When the utilities are not under the control of the installation, an effort should be made to ensure that the building owner is

properly maintaining the utilities. The staff however, should know how to get help in the event of any utility failure and what to do until help arrives. Emergency phone numbers and procedures should be written down and should be reviewed at least quarterly to ensure they are current.

EXHIBIT 2-3-A
CHECKLIST FOR EQUIPMENT EVALUATION

A. NOMENCLATURE

Equipment Name _____
Model Number _____
Serial Number _____
CMR Number _____
User Department _____

B. EVALUATION CRITERIA (Circle only one for each category)

RISK CATEGORY I

AREA OF UTILITY SUPPORT (A)	POINTS
Operating Room, Special Care Unit, Recovery, Dialysis, Dental Surgery, Medical-Surgical Wards	10
Blood Bank	8
Diagnostic Services (Clinical Laboratory, Radiology)	6
Support and Therapeutic Services (Pharmacy, PT)	4
Mental Health and Psychiatric	2
Administrative Areas	1

RISK CATEGORY II

IMPACT OF FAILURE OR MALFUNCTION (I)	POINTS
Patient Health	4
Patient or Staff Injury	3
Discomfort or Inconvenience	2
No Significant Risk	1

RISK CATEGORY III

PREVENTIVE MAINTENANCE FREQUENCY (F)	POINTS
Extensive	3
Average	2
Minimal	1

FACILITIES MANAGER'S CERTIFICATION: (Insert an X)

It is my determination that the above equipment should____
or should not _____ be included in the utilities management program.

Signature _____ Date: _____

CHAPTER 3 - EQUIPMENT TESTING

3-1 ACCEPTANCE TESTING

Some equipment in the utilities inventory must be initially tested before the system as a whole is activated in order to accept the equipment before activation of the system. Equipment parameters must be met when components are installed and become part of a system. The source for obtaining acceptance parameters is the manufacturer's literature and the designer's requirements decided at the design

development stage. By combining these two sources of information, the Facilities Manager can develop effective acceptance performance standards for each utility system component.

3-2 ROUTINE TESTING

A. Each utility system has certain requirements that need to be periodically verified to assure that the system and each individual component is performing as required for minimum acceptable performance. This testing is similar to acceptance testing but it is conducted periodically for the life of the system and/or whenever a system is modified or compromised. The source of this information is specified in codes, standards or as determined by good engineering practice. By carefully combining these various sources of information, the Facilities Manager can develop the installation's routine performance standards. These routine standards include testing intervals, testing procedures, reporting and correcting device malfunctions, and the required documentation.

B. The determination of testing intervals is a dynamic process which is to be implemented so that adjustments can be made when necessary. By establishing proper testing intervals, the Facilities Manager can conserve staff time and direct maintenance and repair efforts to equipment with the greatest need.

3-3 SAFETY TESTING

A. A program for conducting safety testing of all equipment throughout the installation and the records of the completed tests is of utmost importance. New equipment that fails to pass the applicable safety tests cannot be approved for use in the installation until such deficiencies have been corrected.

B. The initial electrical inspection is performed by the facilities engineering department at the time that the equipment is originally received and accepted at the installation. Facilities engineering will also conduct routine follow up safety checks after completion of any future repairs to the equipment.

(1) Permanently Installed Equipment - Permanently installed (hard-wired) electrical equipment, or where the equipment power cord and attachment plug are neither accessible for inspection nor available for testing, should be visually inspected for physical defects such as cracked or dented surfaces, missing or broken controls and indicators.

(2) Portable Equipment Test Procedure - Equipment that is not permanently installed and whose power cord and attachment plug are readily accessible for inspection and are usable for testing should be:

a. Visually inspected for physical defects such as, cracked or dented case, missing or broken controls or indicators, and missing strain relief cord protectors.

b. Electrical plug checked for damage.

c. Length of the cord checked for fraying, cuts or kinks.

C. If the device passes all tests, then a safety inspection tag should be affixed to the equipment. This serves to notify the users that the equipment is safe for use. If the safety inspection is not current it serves to warn the user of the potential liability of continued use of the equipment.

D. If the device fails the inspection, and the device cannot be physically removed from its location, a distinct warning message shall be placed on the device. The facilities engineering employee conducting the test should inform the Facilities Manager. Whenever possible, equipment found defective with obvious hazard to the operator's or patient's health and/or safety will be removed immediately from its location by the inspector and brought to the facilities engineering shop area. A work order to correct the defect will be generated by the facilities engineering employee who removed the equipment.

3-4 INSPECTION SCHEDULING

The Facilities Manager should schedule utility equipment and/or system inspections through the PM schedule. Work orders should be generated immediately to correct any identified deficiencies. Inspections should be scheduled at least annually or sooner if required by codes, standards or law. Upon completion of testing the Facilities Manager will forward a report of the inspections to the service unit safety committee for dissemination to all departments through the committee minutes.

3-5 DOCUMENTATION OF TESTING

The results of all testing must be documented to establish the baseline historical record.

Documentation must include at a minimum:

- When the test/inspection took place (date).
- What the acceptable parameters are and what the test results were.
- Who conducted the test/inspection/calibration.
- Inspection reports shall be maintained in the facilities engineering office files.

3-6 REMOVAL OF UNSAFE EQUIPMENT FROM SERVICE

A. Equipment that is found to be defective will be rapidly remove from use and the appropriate staff notified. The facilities engineering department shall respond in a timely manner to protect patients and staff from hazardous and potentially hazardous equipment. Identified hazards or potentially hazardous incidents shall be investigated and reported to the installation safety committee.

B. Remedial action such as routine inspection, modification, removal and/or replacement of equipment, and user training if applicable should be implemented as appropriate. Repairing of isolated components failures, or minor problems, which are not expected to recur should be excluded from the reporting requirement.

C. Equipment found to be defective should be impounded until the completion of the incident investigation. Facilities engineering should investigate the reported hazard to determine its cause. If an equipment defect is found to be the cause, the Facilities Manager should initiate immediate action or recommend appropriate action to the installation safety committee for correction of the problem. This shall include permanent removal of the equipment from service if it presents a continuing hazard. Hazards which are life threatening or which pose imminent danger to employees or staff, should be corrected immediately.

D. If it is determined that the incident was caused by an operator error, the Facilities Manager should report the findings to the installation safety committee, and the appropriate department head. The Facilities Manager should make recommendations for resolution of the problem to prevent recurrence of the incident.

E. Hazard alerts received by the Facilities Manager must be resolved immediately and must be reported to the installation safety committee along with the action taken. The Facilities Manager should monitor health care engineering publications for recalls and hazards associated with utilities equipment at the installation.

F. All reportable hazards and corrective actions taken must be documented. Hazard summaries and trend analysis must be reported to the installation safety committee on a quarterly basis.

   (1) All information pertaining to the incident and corrective action should be included, but not be limited to, the following items:

      a. Description of the device (name, model, serial number, manufacturer, PM number).

      b. Physical condition of the device.

c. Environmental conditions.

d. Name of the operator (if available) or person reporting the incident.

e. A description of how the event occurred.

f. Safety inspection results.

g. Summary of the investigation and recommended action.

(2) If the incident involves an electrical shock, an electrical safety inspection must be performed immediately.

(3) If a defect is found to be the cause, the Facilities Manager should validate the hazard with the equipment manufacturer, determine the proper corrective action and initiate a work order for the corrective action. In cases where the manufacturer is liable for the correction of a design defects, improper installation and/or maintenance, the Facilities Manager should coordinate the incident with the service unit procurement office. This may require the manufacturer to be brought on site to investigate the problem and take corrective action. All manufacturer's actions must be documented and included in the final incident report.

(4) If it is determined that the incident was caused by operator error, the Facilities Manager should report the findings and make recommendations to the appropriate user department head for resolution of the problem, including user training to prevent recurrence of the incident. The affected department head should present a comprehensive incident report to the installation safety committee.

(5) Follow-up must be provided on the regularly scheduled PM inspections to determine the effectiveness of the corrective action.

CHAPTER 4 - RESPONSIBILITIES

4-1 FACILITIES MANAGER

A. Evaluates new or additional utilities equipment within 30 days of installation to ensure that it is considered for inclusion in the program.

B. Submits recommendations for changes to the service unit safety committee.

C. Coordinates the operation and maintenance of a structured utilities program.

D. Reviews utility program annually and documents in writing the review and findings to the service unit safety committee.

E. Conducts annually one simulated utility outage drill with the facilities staff to ensure facilities staff response. Documents the exercise in writing to the service unit safety committee.

F. Enforces continuous PM, testing and inspection of utilities equipment to minimize interruption of service. Ensures PM schedules are met and adequate documentation is maintained.

G. Conducts cross training of all facilities maintenance personnel to ensure that they are all aware of their assigned duties during a failure of a utility system.

H. Ensures a current detailed list of facility areas served by each utility system/branch is maintained in the facilities office for notifying departments in the event of outages.

I. Reports utility system failure incidents to the service unit safety committee for risk assessments.

J. Reviews work orders for modifications to utility systems that may require entry, edit, or deletions to the inventory.

K. Ensures that utility system narratives and failure response plans are current and that all modifications resulting from additions and/or modifications are included in an update of the plan.

4-2 INSTALLATION SAFETY COMMITTEE

A. Reviews and approves the utility interruption incident reports submitted for risk assessments and recommends actions to minimize or avoid more future incidents.

B. Reviews and approves the annual review of utilities report submitted by the Facilities Manager.

C. Reviews and approves recommendations of deviations and/or

modifications to the criteria forwarded from department heads on changes to utility failure plans.

D. Reviews installation utility management plan and all departmental procedures at least every three years.

4-3 DEPARTMENT HEADS

A. Each applicable department shall develop failure plans to implement actions in their department by their subordinate employees during failure of utilities.

B. Develop procedures within their respective departments.

C. Coordinate training within their departments to ensure their staff are proficient in the steps to be taken in the event of utility system failures.

CHAPTER 5 - TRAINING

5-1 REQUIREMENTS

Accreditation requires that personnel whose duties involve the use of utilities, or equipment impacted by utilities and those who maintain equipment and utilities must receive continued education with respect to their job responsibilities at least annually.

A. Establishing and managing an effective training program for facilities engineering employees is a dynamic process requiring continual updating and development, and demands significant effort from the Facilities Manager in order to succeed. Facilities Managers must therefore establish a program of continuing education that will train the personnel who maintain utility systems which may pose a high risk to patient, staff or visitor safety.

B. All new facilities engineering employees whose duties require them to maintain utility systems must have their training needs assessed within the first two weeks of employment. This will enable the Facilities Manager to develop a training schedule tailored for each facilities engineering employee.

C. Training should include initial orientation, additional training when changes are to occur and, in certain cases, periodic (e.g. annual) continuing education, and evaluation for effectiveness.

D. In the case of facilities engineering personnel, it is important to note that there is presumed basic competence of personnel in their respective craft or trade. The training required by this standard is the initial and recurring training needed to tailor the knowledge and skill of these persons to the requirements of a particular installation, including specialized technical training, infection control training (unique to hospital environment), and emergency operating and failure procedures.

5-2 POLICY

A. Regardless of the source, complete documentation of utility system training must be readily accessible for review and analysis by accreditation surveyors.

Minimal documentation should include:

(1) Date of Training
(2) Title of Course
(3) Course outline
(4) Instructor's name and Title
(5) Names of the participants

B. It may be found helpful to identify all required training for the

facilities engineering department by setting up a chart or grid with all the data. This will facilitate the monitoring for compliance. Accreditation surveyors often appreciate concise and readily reviewable documentation such as charts, grids and matrix data presentations in determining installation compliance with standards.

5-3 PROCEDURES

A. Facilities Managers shall ensure that facilities engineering employees, including temporary employees, are oriented properly on the hazards involve in the maintenance of some critical utility systems and implementation of contingency plans for failure of a utility.

B. Equipment training needs must be assessed to determine which systems or sections of systems needs to be identified as critical. Training must be considered for all equipment. Events such as equipment failures, user errors, accidents, interruption of services, employee turnover, equipment age, hazard reporting and other conditions which create a risk to patient or user should be considered when determining the type of additional training needed.

C. Additional training should be indicated when:

(1) A problem is identified that appears to be related to a user misuse or abuse. The user's supervisor should be informed that the employee needs training.

(2) Modifications are made to the system that impact the facilities engineering interaction with the equipment.

(3) Changes in policies or operating procedures.

(4) Facilities engineering employees request the additional training.

D. Training must be provided when the supervisor and employee agree on the need for additional training. Training will vary from a brief orientation by supervisors or co-workers to specialized training through a combination contractor furnished training and on-the-job training.

E. Emphasis must be placed on new employees and new equipment.

F. Training must be assessed on an annual basis.

G. Orientation and training assessments must be documented. Training and attendance records are to be filed in the facilities engineering office and be easily retrievable for review by accreditation surveyors.

CHAPTER 6 - EQUIPMENT REPLACEMENT PLAN

6-1 PURPOSE

The purpose of a utilities equipment replacement plan is to enable a Facilities Manager to plan and schedule equipment replacement costs over a period of time. The plan identifies equipment which, when needing replacement, will significantly impact the funding in a service unit if it had to unexpectedly absorb the equipment replacement costs within its budget.

6-2 SCOPE

A. An equipment replacement plan is an itemized listing of building service equipment. The plan includes equipment that should be scheduled for replacement over the next five years. The Indian Health Facilities appropriation, M&I activity allows replacement of real property equipment. Therefore, there is a need for planning the replacement of equipment so that the Facilities Manager can plan for systematic replacement with the appropriate funding.

The following planning actions will assist in the development of an equipment replacement plan:

(1) Funding - Planning for equipment replacement enables adequate budgeting to ensure funding is available when needed. The funding impact to the Area and indirectly to the other service units can be absorbed easier if several items are replaced over several years rather than at one time (i.e., replace one boiler at a time at $50,000 each rather than three at the same time for $150,000. Each Area should develop its own written guidelines relative to the amount of funds that will be set aside for equipment replacement. A minimum limit that an item must cost to include it in the five year equipment replacement plan, as compared to replacement out of the service unit bench stock, should be part of a written Area criteria. Some Areas like Bemidji, Portland and Nashville have unique conditions which require that the limit be small due to the lesser amount of total M&I allocation the entire service unit will receive for routine activities. The impact of replacing a $4,000 boiler by a service unit that only receives approximately $8,000 for routine activities is extremely significant. Replacing the boiler as a project may not guarantee the replacement as it will need to compete with all the other projects in the Area. The fact that the equipment may still be operational may not give it a sufficiently high priority to be funded.

(2) Minimize Emergency Replacements - Equipment should be replaced near the end of its useful life, but before it

fails and becomes an emergency situation.

(3) Purchasing - Adequate time is available to purchase and manufacture a long lead equipment item which is not a stock item.

(4) Scheduling - Equipment replacement can be scheduled to be performed at non-critical hours.

(5) Phased Replacement - Replacement of multiple units of the same item should be phased (i.e., in a facility with four chiller units, one could be replaced each year rather than replace all four in the same year). This distributes the total cost of replacement over several years.

B. The plan will ensure that equipment is replaced in an economic and reasonable fashion. Failure to plan replacements will create the problems encountered when emergency breakdowns require emergency replacements. This causes disruptions in the operation of the health care program, the facilities engineering program plan (FEPP) and in some cases may even cause threat to life.

6-3 METHODOLOGY

This plan is not intended to cover total system replacements (e.g., replacements of HVAC and fire alarm systems etc.). The replacements of systems is accomplished as projects under Section II, of the Consolidated Work Plan in the annual FEPP submission.

Examples of the type equipment contemplated are:

- Primary and secondary electrical distribution components (e.g., transformers)
- Water heaters, boilers, expansion tanks
- Pumps (return condensate, wellwater, feedwater, etc.)
- Air handlers, exhaust fans, heat exchangers
- Chillers, air conditioning package units, cooling towers
- Compressors for pneumatic and electro-mechanical controls

6-4 LONG RANGE FORECASTING

Real property building service equipment can be very expensive to replace and is often critical to the operation of a facility. Therefore it is necessary to schedule the replacement of the equipment systematically. Equipment of this type should be scheduled for replacement when it is within five years of its expected life, even if it is operating properly. The basis for replacement is an assessment

of the documented repair costs contained in the equipment record card of each item of equipment. A general rule of thumb is that equipment that is within five years of its expected useful life and/or whose repair costs exceed 60% of the value expended on repairs should be scheduled for replacement. This is only a general rule of thumb as different items of equipment have a useful life that is unique to the duty and type of equipment. This will affect the percentage of replacement cost defined above.

6-5 FORMAT

A Five Year Equipment Replacement Plan for M&I funds is found in The Technical Handbook for OEHE, Volume VI, Facilities Engineering, Part 71, FEPP.

CHAPTER 7 - QUALITY ASSURANCE

7-1 REQUIREMENTS

A. The utilities management program must be included in the facilities engineering quality assurance program. The program must be based on monitoring and evaluation of installation failure incidents, equipment disruptions, and maintenance history. Accreditation requires that an effectiveness review of the entire utilities management program be conducted on an annual basis. Facilities Managers therefore, need to systematically monitor the program using indicators developed specifically to monitor program implementation. The annual effectiveness review must be in writing and forwarded for concurrence by the installation safety committee and approval of the service unit Governing Body.

B. Facilities engineering plays a key role in determining what significant incidents must actually be reported to the installation safety committee. Evaluation of significant incidents must occur expeditiously if the program is to operate effectively. The key element for facilities engineering is that only incidents occurring as a direct result of facilities engineering involvement can be reported by the Facilities Manager. Incidents need to be reported by the user department(s) or the department(s) that were affected as a direct result of the utility failure. The incident report must however, be routed by the affected department head through the Facilities Manager, to the installation safety committee for review and further action. A review of the incident needs to be made by the Facilities Manager before the report is forwarded to the installation safety committee because although a department may be knowledgeable of the circumstances of the incident it may not be capable of recommending corrective action for the incident. The information required to be documented for a proper evaluation of an incident can only be documented by the individual witnessing the occurrence if the evaluation is to meaningful.

C. Since all equipment incidents may not be classified as critical to the operation of the facility, the installation safety committee needs to identify what incidents are significant and should be reported. In addition, there is a need to identify the parameters that will be used to measure the minimum acceptable performance of the program. A method for reporting incidents which identify and document significant problems, failures and user errors is essential for collecting and gathering data in determining relevancy. An incident report for utility failures provides a mechanism to elicit necessary information for properly assessing incidents.

7-2 IMPLEMENTATION

An effectiveness review of the utilities management program requires the following steps to implement monitoring of the program.

A. Identify the utility an/or utility equipment that needs to be monitored. These shall include high risk, and/or problem prone areas with direct failure impact on the patient care mission of affected departments.

B. Establish indicators to monitor, measure, and evaluate the effectiveness of the program performance.

(1) Measure the percentage of un-scheduled equipment failures per quarter. Facilities related malfunctions would be failures attributed to equipment failure as a result of poor maintenance (lack of adequate PM) or utility failure.

(2) Measure and evaluate user and maintainer knowledge and skill requirements regarding their role in the utilities management program.

(3) Measure and evaluate routine emergency and incident reporting procedures, including when and to whom such reports are to be communicated.

(4) Measure and evaluate inspections, preventive maintenance, and testing of utility systems.

C. Establish a threshold for evaluations such as the point at which an in-depth review will be triggered. For example, more than one equipment interruption occurs per month in any one quarter.

D. Establish and implement a process for collecting the necessary data.

7-3 REPORTING OF UTILITY FAILURES

A. REQUIREMENTS

(1) It is necessary that all significant utility problems, failures, and user errors that are or may be a threat to the patient care environment be identified and documented, summarized and reviewed by the installation safety committee. An analysis of the error will be conducted and appropriate adjustments made to ensure that future recurrences are avoided.

(2) Reportable errors, failures or problems that may posed or may pose a threat to the patient care environment must be defined by the installation safety committee.

The following criteria may assist in defining reportable incidents.

a. Significant Reportable Incidents - Incidents of utility failure, malfunction error, or problem that pose or may pose be a threat to the patient care environment and result or could result in injury, or death to patients. staff or the public.

b. User Error - An error caused by the improper use of a utility or utility equipment by the user.

B. PROCEDURES

(1) When a failure incident occurs an incident report will be prepared within 24 hours of the incident. The report must be prepared by the supervisor of the area where the incident occurred. The written report must forwarded through the Facilities Manager to the service unit safety committee for risk management analysis. The Facilities Manager will review the report, and attached any comments with recommendations to the installation safety committee for action and approval.

(2) Any facilities engineering employee having knowledge of a user error incident outside of the facilities engineering department will report the incident to the Facilities Manager for follow up action.

(3) Actions recommended by the installation safety committee must be implemented expeditiously.

(4) Follow up actions will be accomplished by the Facilities Manager to ensure that the actions recommended by the committee continue to be implemented.

(5) Facilities engineering will maintain an incident log on all reportable equipment problems, failures, and user errors.

7-4 REPORTS

A. TYPES OF REPORTABLE INCIDENTS

- Decrease or increase in pressure
- Decrease or increase in temperature
- Improper use of the utility by a user
- Utility outage without proper notification to user departments
- Failure to activate utility properly during activation after failure
- Improper user maintenance

- Problems that should have been corrected by the user

B. CLASSIFICATION OF INCIDENTS

(1) User Error - This report is prepared by the user since the failure was attributed to the user.

The report shall include:

a. Errors that have a serious effect on safety

b. Errors which occur repeatedly

(2) Hazard Alert - This report is made by the property management department since the incident is attributed or could be attributed to a potential failure of the equipment.

a. Number of hazard alerts forwarded to department heads

b. Number of hazards which required action by the user

c. Number of hazard alerts which required facilities engineering action.

Included in this report should be hazard alert information which is the responsibility of the user department, is more than 30 days old and has not been corrected.

(3) Incident - This report is made by the department experiencing the failure.

C. FREQUENCY

(1) Incident - Incidents should be reported to the Safety Officer within 48 hours of their occurrence by the supervisor of the area(s) affected.

(2) Quarterly - A summary report should be reported to the safety committee by the Safety Officer on a quarterly basis.

(3) Annually - An effectiveness review of the entire program should be conducted by the Safety Officer on an annual basis.

D. FORMAT

The following format should be followed to assist in preparing a comprehensive report.

(1) Findings - A summary of the data collected and of any trends identified. For example, report the percentage of completion for PM and note if it has decreased since the last reporting period.

(2) Opportunities for Improvement - Identify trends or incidents

which indicate a recurring problem which should be addressed. This may also include incidents which warn of impending problems.

(3) Conclusions and Recommendations - Determine what needs to be done as a result of each findings. Identify causes or suspected causes of problems. Identify specific actions to be taken to resolve each problem. Identify actions that can be done within the department as well as actions which may require upper management involvement.

(4) Actions Taken - Describe actions which have been recommended and/or taken since the last reporting period.

(5) Results - This section should be used to follow up on all unresolved problems identified in previous reports. Additional actions may be recommended in this section if previous actions have not been effective.

(6) Responsible Official - State the name and title of the individual(s) responsible for the actions to be implemented to correct the identified deficiency.

(7) Follow-Up Action - State the date and name of individual that the safety committee designates to monitor the recommended corrective action. A written follow-up report will be made to the safety committee.

EXHIBIT 7-2-A
PERFORMANCE STANDARDS

STANDARD: 100% OF APPLICABLE STAFF IS ABLE TO DESCRIBE THE PROCESS FOR REPORTING UTILITY PROBLEMS AND FAILURES

Sample Size: 30 employees or all employees which ever is less
Frequency: Quarterly
Data source: Staff survey

STANDARD: 80% OF UTILITY PM WAS COMPLETED ON SCHEDULE

Sample Size: Scheduled PM
Frequency: Quarterly
Data Source: PM records

STANDARD: 100 % OF UTILITY EQUIPMENT TESTING WAS COMPLETED ON SCHEDULE

Sample Size: All utility equipment scheduled for testing
Frequency: Quarterly
Data Source: Testing Schedule

STANDARD: SIGNIFICANT UN-SCHEDULED UTILITY INTERRUPTION INCIDENTS WILL BE REDUCED BY 30% AS COMPARED TO THE PREVIOUS YEAR

Sample Size: All significant incidents
Frequency: Quarterly
Data Source: Safety Committee incident reports

STANDARD: 100% OF APPLICABLE PATIENT CARE STAFF IS AWARE OF THE LOCATION AND OPERATION OF MEDICAL GAS SHUT-OFF VALVES

Sample Size: 10 employees or all employees which ever is less
Frequency: Quarterly
Data Source: Survey the applicable patient care staff

STANDARD: ALL USERS AND MAINTAINERS OF CRITICAL UTILITIES EQUIPMENT RECEIVED ANNUAL REFRESHER TRAINING

Sample Size: 20 employees or all employees which ever is less
Frequency: Annual
Data Source: Safety committee minutes

STANDARD: THE EMERGENCY GENERATOR WAS ALWAYS TESTED IN COMPLIANCE WITH THE 30/50% RULE

Sample Size: 12
Frequency: Annual
Data Source: Test reports

STANDARD: SIGNIFICANT UTILITY INTERRUPTIONS WILL BE REPORTED TO THE SAFETY COMMITTEE WITHIN 30 DAYS 90% OF THE TIME

Sample Size: 12
Frequency: Annual
Data Source: Test reports

STANDARD: ALL UTILITY MAIN SHUT-OFFS WERE TESTED ON SCHEDULE

Sample Size: All scheduled Valves/Breakers
Frequency: Annual
Data Source: Test reports

STANDARD: THE UTILITY MANAGEMENT PLAN AND ALL UTILITY DEPARTMENTAL PROCEDURES WERE SUBMITTED FOR REVIEW TO THE SAFETY COMMITTEE ON SCHEDULE

Sample Size: All departments
Frequency: Annual
Data Source: Safety committee minutes

EXHIBIT 7-3-A
UTILITY FAILURE INCIDENT REPORT

DATE OF OUTAGE _____

DURATION OF OUTAGE From _____ a.m./p.m.
To _____ a.m./p.m.

UTILITY AFFECTED (Check One), If more than one prepare a report for each utility separately.

____ Electricity	____ Emergency Power	____ Elevator
____ Elevator	____ Nitrous Oxide	____ Steam
____ Heating	____ Medical Air	____ Hot Water
____ Ventilation	____ Oxygen	____ Vacuum
____ Air Conditioning	____ Domestic Water	____ Sewer
____ Other (Specify)		

LOCATION OF OUTAGE (Areas affected) _____

CAUSE OF OUTAGE

CORRECTIVE ACTION TAKEN TO AVOID FUTURE OCCURRENCE

_____
_____
_____
_____
_____

PERSONS NOTIFIED WHEN UTILITY FAILED Time Notified

Director of Nursing _____
Emergency Room _____
Surgery _____
Radiology _____
Intensive Care _____
Clinical Director _____
Outpatient/Admission _____
Other (Specify) _____

INDIVIDUAL PREPARING THIS REPORT

_____ (PRINT NAME) _____ Date: _____

Telephone Number _____

SCHEDULE

DATE FOR FOLLOW UP REVIEW _____

EXHIBIT 7-3-B
SAMPLE
QUARTERLY INCIDENT REPORT TO SAFETY COMMITTEE

DATE: August 5, 1993

TO: Chairperson
Service Unit Safety Committee

FROM: Facilities Manager

SUBJECT: Quarterly Incident Report
Second Quarter FY 93

1. This report provides a summary of events, corrective action taken, and recommendations on reportable utility failure incidents affecting this installation for the second quarter FY 93.

   Individual incidents are listed below in chronological order:

A. NEW INCIDENTS

   (1) MESCALERO CLINIC

   Incident No. 1 - An air conditioning failure in the radiology equipment room Building l, Room 231 resulted in shutting down clinical procedures in the radiology space.

   Events - On the morning of June 25, 1993, the a/c equipment in radiology was unable to maintain proper temperature and humidity control. Lack of environmental control made it impossible to conduct procedures. The development of the images was being affected to the point the radiologist could not proceed with operation of the equipment. Facilities personnel responded promptly to the problem and found two defective expansion valves on the a/c units and several refrigerant leaks. The equipment computer had to be shut-down by clinical engineering to make the necessary repairs. It was determined that lack of testing the valves on a scheduled basis led to the incident.

   Corrective Action Taken - Jones Plumbing and Heating Inc. replaced the defective expansion valve with a better quality valve and repaired the refrigerant leak. The radiology equipment was restored to normal operation by start of work day, June 27, 1993.

   Status - Closed. No further action necessary. The valve was put on the exercise list for annual testing.

   Incident No.2 - Ground fault occurred on the electrical riser for

the 5th floor penthouse (Building #1).

Events - On June 28, 1993 at 2:15 p.m., facilities personnel found that the ground fault breaker for the electrical riser that feeds the 5th floor penthouse was tripped. This riser feeds AC-12 and AC-13 for the clinical addition. Facilities employees located the source of the electrical fault at a loose connection in a junction box in service room #1, Building #1.

Corrective Action Taken - Emergency repair required shutting down AC-12 and AC-13 which cool the clinical addition. Facilities replaced the wire splice nut.

Status - Closed no further action required.

Incident No.3 - Air conditioning intermittent failure in the surgical suite.

Events - On June 29 and June 30, 1993, the surgical suite 20-ton roof-top air conditioner went into an alarm condition for the compressor. The fault code notified the operator on duty and the equipment was reset on both occasions by facilities employees. Fractional amperage fuses were installed to identify possible defective sensors.

Corrective Action Taken - Defective brass hot gas discharge sensors were identified by blown fuses. Facilities employees replaced several sensors with stainless steel sensors. During repair, adequate temperature and humidity were maintained in the surgical suite area.

Status - Closed, no further action necessary.

(2) SANTA ROSA CLINIC

Incident No.1 - Total electrical power outages, facility-wide.

November 6, 1992 - Three power outages (facility-wide) occurred on November 6. The time intervals were 10:17 am - 10:32 am, 3:36 pm - 3:45 pm, and 4:08 pm - 4:24 pm. Storms in the area caused the electrical power company outages.

June 7, 1993 - Two electrical power outages (facility-wide) occurred on June 7 which were of substantial time intervals. The intervals were from 4:34 am - 5:30 am and 5:56 am - 7:19 am. Major storms in the area caused damage to the electrical power company's transmission line due to fallen trees during the storm.

Corrective Action Taken - The Facilities Manager and facilities employees responded to the call back within 20 minutes of the call. Emergency procedures were followed during the multiple outages. The transmission and distribution crew of the utility company responded with a letter stating their regret over the outages, very brief description of the causes, and informing us

of new emergency phone numbers to contact in the future. In addition, they again offered the proposal to provide a back-up 34 kv substation for $400,000, which had been rejected by the Area office, and OES as uneconomical to fund during the upgrade of the electrical distribution system. The electrical utility company does not guarantee the elimination of power outages even if the back up 34 kv supply is added. Momentary outages is something we will need to live with. The only other option is to install an emergency generator for back up electrical power. This is not required by code therefore giving little, if no chance of being funded at the Area level.

Status - Closed, no further action necessary.

Incident No 2 - Temporary water outage facility-wide

Events - On July 10, 1993, a water outage on a facility-wide basis occurred from 8:50 am - 11:10 am. The utility company lost water pressure due to a water main rupture by a contractor on Interstate 40.

Corrective Action Taken - The Facilities Manager responded and reset the main loop valve to the south entrance loop, which water when the utility company advised such action.

B. PREVIOUS INCIDENTS

Incident of June 15, 1993 - The recommendation to dynamically balance AC-8 that serves the surgical suite has been completed. The new pulley has been installed. We have scheduled a third and final performance re-evaluation of the unit.

Status - Open, performance to be again re-evaluated in November 1993.

EXHIBIT 7-3-C
SAMPLE
ANNUAL EFFECTIVENESS PROGRAM REVIEW

DATE: November 14, 1989

FROM: Facilities Manager

SUBJECT: Annual Review of Utilities Management Program

TO: Service Unit Safety Committee

The following review provides a comprehensive analysis of the utilities management program.

FINDINGS - Summarize the data collected and of any trends identified.

A. **NUMBER OF INCIDENTS:**

(Attach the four quarterly report of incidents for this reporting period.)

(1) User Errors:

Were there user errors this reporting period? Were they reported within 30 days of the occurrence to the Safety Officer? What actions were taken to prevent recurrence?

(2) System/Equipment Errors:

Were there system/equipment failures this reporting period? Were they all reported within 30 days of occurrence to the Safety Officer? What actions were taken to prevent recurrence?

(3) Reports:

Were all incidents reported by the Safety Officer to the safety committee quarterly?

B. **INVENTORY STATUS:**

Is the inventory current as of this date? List the number of additions or deletions to the program during this reporting period.

C. **REVIEW OF DEPARTMENTAL CONTINGENCY FAILURE PLANS:**

Were all departmental procedures reviewed by the applicable departments and documentation of the review forwarded to the

safety committee?

D. **REFERENCE DOCUMENTS:**

Were all reference documents reviewed by the Facilities Manager? Is there a current, complete set of documents that indicate the distribution of each utility system, including controls for a partial or complete shutdown?

E. **TESTING AND INSPECTION OF SYSTEMS:**

Were all required tests and inspections performed this reporting period? Were they performed as scheduled?

F. **TESTING OF SHUT OFF DEVICES:**

Were all critical shut off devices exercised as scheduled this reporting period?

G. **PM OF SYSTEMS AND EQUIPMENT:**

Were all preventative maintenance requirements, tests and inspections required by code, law or regulation met?

H. **TRAINING:**

Was all refresher training accomplished as planned? Are staff who use and maintain utilities and equipment oriented and trained in accordance with JCAHO standards?

OPPORTUNITIES FOR IMPROVEMENT - Identify trends or incidents which indicate a recurring problem which should be addressed. This may also include incidents which warn of impending problems.

CONCLUSIONS AND RECOMMENDATIONS - Determine what needs to be done as a result of each findings. Identify causes or suspected causes of problems. Identify specific actions to be taken to resolve each problem. Identify actions that can be done within the department as well as actions which may require upper management involvement.

ACTIONS TAKEN - Describe actions which have been recommended and/or taken since the last reporting period.

RESULTS - This section should be used to follow up on all unresolved problems identified in previous reports. Additional actions may be recommended in this section if previous actions have not been effective.

FOLLOW UP ACTION - When problems were identified and actions taken, were they evaluated afterwards for their effectiveness?
Were the actions taken effective? If not, what future actions are planned to ensure compliance? Were the actions taken effective in preventing other recurrence the same year?
Have opportunities for improvement been identified over the past year? If not, please explain, and include actions taken to ensure

compliance:

SUMMARY - Summarize the incident report for the past year by category and analyze for trends if applicable.

RATING: - Rate the overall effectiveness of the Program for this reporting period

_____ POOR ____ FAIR ____ GOOD ____ EXCELLENT

(Justify the rating)

_____ Date _____
SAFETY OFFICER

APPROVED/DISAPPROVED
_____ Date _____
CHAIRMAN, GOVERNING BODY

CHAPTER 8 - MISCELLANEOUS UTILITY REQUIREMENTS

8-1 SCHEDULING OF UTILITY INTERRUPTIONS

A. REQUIREMENTS

Each installation needs to develop guidelines for the development and implementation of procedures to be followed when scheduled shutdown of any utility service is required. These procedures are required to ensure that the facility staff is fully aware of the impending interruption of the utility. This action is intended to maximize the safety of the patients, staff, and visitors, while minimizing the legal and financial risks.

B. DEFINITIONS

(1) Minor Interruption or Shutdown - Interruption or shutdown expected to last no more than one (1) hour and affect no more than a three (3) room area.

(2) Major Interruption or Shutdown - Interruption or shutdown expected to last more than one (1) hour or affect more than a three (3) room area.

(3) Emergency Interruption or Shutdown - Interruption or shutdown necessary to minimize further utility loss/failure, system/equipment damage, or safety hazard.

C. PROCEDURES

A utility system or portions of one or several may need to be occasionally shut-down voluntarily. This may be due to repairs, maintenance, remodeling or new construction occurring in the facility. The interruptions may be attributed to internal (within the property) or external (exterior to the property) reasons. Before any utility system service may be interrupted or shutdown, a utility service shutdown advisory (Attachment A) must be initiated. This will identify all pertinent information about the shutdown and indicate the necessary individuals for notification and concurrence.

(1) Utility service shutdowns will be coordinated with all affected departments prior to occurrence. A minimum mobilization time of 48-hours will be considered for all scheduled shutdowns.

(2) The Facilities Manager will initially assess the areas that will be affected by the shut-down.

(3) When the utility interrupted space is identified a schedule will be developed with the department heads of the affected areas. The affected departments will be notified and consulted to determine the most appropriate time of shutdown

in order to minimize the disruption to patient care. Time and date will be determined at the convenience of the installation staff not the facilities engineering department. The department heads in the areas affected will have the final say in deciding the least convenient time for the shut down. Patient care will govern in making the final determination of the shut-down.

(4) In the event of disagreement between the clinical, administrative staff and the Facilities Manager the Service Unit Director will be consulted for a solution to the problem.

(5) Upon arrival of a mutual acceptable date and time the Facilities Manager will prepare a memorandum outlining the agreed shutdown. The written notice will be hand carried to each affected department by the Facilities Manager or a facilities supervisory employee 48 hours in advance of the shut down. This will ensure that any last minute details can be answered.

The shutdown memorandum will include the following:

a. Type of utility shutdown
b. Locations affected (floor, wing)
c. Time shutdown will start
d. Duration
e. Estimated time shutdown will end

(6) Interim life safety measures as applicable will be provided during the interruption as necessary.

(7) The Facilities Manager should be the only authorized individuals in facilities engineering that should coordinate scheduled shutdowns.

(8) The Facilities Manager will ensure all departments at the installation are notified the day before the shutdown through an announcement over the public address system or by telephone. The second follow up notification by facilities will be conducted two hours prior to the shut-down.

(9) Upon completion of the shutdown, the affected department heads will be notified through an announcement over the public address system and by telephone.

(10) All incoming referrals regarding the shut down will be made to the Facilities Manager only. This will ensure control so that everyone receives the same information.

(11) Shutdowns should be discussed with the facilities engineering staff to ensure adequate planning, and assurance that all locations affected are included prior to the

scheduling meeting with department heads.

D. RESPONSIBILITIES

Facilities Manager:

(1) Ensures the timely resolution of problems by following the procedures outlined above.

(2) Ensures that lock-out/tag-out is applied to any system requiring shutdown.

(3) Conducts telephone notification and delivery of written notices.

(4) Ensure subordinates are aware of this procedure by conducting refresher training. This will ensure quick facilities staff response capabilities.

(5) Initiates and coordinates the necessary notification, consultation, and concurrence for interruption of utility system services.

8-2 EXERCISING UTILITY EMERGENCY SHUT OFFS

A. REQUIREMENTS

All installations will implement a routine program for the testing (exercising) of all emergency shutoff devices. All devices will be activated (open and closed or vice versa) following an established schedule at least annually. This will ensure proper functioning in the event of an emergency incident requiring immediate shut-off. All critical shutoff valves and electrical breakers will be clearly identified and marked, to assist facilities engineering personnel in promptly locating and isolating utilities in the facility.

B. PROCEDURES

Activation will be conducted for the supply and return valves as appropriate following the schedule below:

Utility	Scheduled Month
Steam	September
Fire Sprinkler	September
Natural Gas	September
Medical Air	September
Vacuum	September
Oxygen	September
Nitrous Oxide	September
Sanitary sewer	March
Electric	March
Chiller Water	March

Potable Water	March
Hot Water	March

C. RESPONSIBILITIES

Facilities Manager

(1) Ensures testing and documentation is accomplished within 5 work days after scheduled month.

(2) Ensures rotation of duties among facilities employees to familiarize subordinates with shut-off locations.

(3) Maintains written documentation of the testing and takes immediate corrective actions when necessary.

8-3 DOMESTIC HOT WATER LIMITS

A. REQUIREMENTS

All installations will establish guidelines to monitor the temperature of the domestic hot water at all showers, bathing and hand washing locations. The implementation will ensure that terminal controls are properly set to prevent inadvertent scalding. A written policy specifying the maximum allowable system temperature authorized for the service unit by the respective Clinical Directors should be implemented for each installation.

(1) The temperature shall not exceed 120 degrees Fahrenheit at each exit outlet.

(2) Areas requiring higher temperatures (dishwashers) will be accomplished by installation of boosters in the specific locations.

B. PROCEDURES

(1) Facilities must install and maintain controls that limits the temperature of the hot water at the established approved limit.

(2) The Facilities Manager at each installation will monitor the temperature of the hot water at the beginning and end of each day and keep a written log of the readings. If the temperature is not in the proper range appropriate adjustments will be taken immediately. The Facilities Manager will be informed of the incident for reporting to the service unit safety committee as a utilities failure incident report.

(3) In the event patients in certain areas are less sensitive to heat a deviation from the pre-established temperature

requirements is to be requested by the Clinical Director to the Facilities Manager.

(4) All efforts will be to maintain the water temperature at the approved limit. Any deviation from these pre-established temperature requirements is to be requested by the Clinical Director to the Facilities Manager in the event patients in certain areas are less sensitive to heat.

C. RESPONSIBILITIES

Facilities Manager

(1) Reviews and initials the temperature log monthly to ensure that the temperature is being maintained at all times.

(2) Ensures that problems brought to his attention be any staff member, will be immediately investigated and appropriate action taken.

(3) Ensures that these controls are met at all times.

(4) Report any incident to the facility safety committee under the utility interruption procedure of the utility management program.

8-4 HEATING/COOLING SEASON START-UP CRITERIA

A. REQUIREMENTS

Each installation should have clear written established procedures to be followed for the start-up and shut-down of equipment for the heating/cooling season each year. The criteria should consider energy conservation but with the utmost concern for patient comfort at all times. The determination of the criteria and subsequent modifications will require consultation with the Clinical Director at each installation. The Facilities Manager through the Service Unit Director, has the responsibility for implementation of energy conservation measures at this facility.

NOTE: Each site needs to establish the dates for the start of the cooling/heating season appropriate to its geographic location.

(1) The heating season at each facility should be established as approximately September 23 to May 23.

(2) The cooling season at each facility is established as approximately May 23 to September 23.

B. PROCEDURES

Buildings that house patients overnight are considered to be the most critical; consequently, these buildings are of the most concern in terms of environmental quality. All other buildings will be treated the same as administrative buildings. When more than one unit is used to heat/cool a building each unit will be considered as though it were a separate building for the implementation of this criteria.

(1) **HEATING**

a. Buildings with Overnight Patients

- If the average outside dry bulb temperature from 12:01 a.m. to 7:00 a.m. goes below 55 degrees three consecutive days, the heat will be turned on for these buildings.

OR

- If the average inside dry bulb temperature goes below 68 degrees three consecutive nights the heat will be turned on in said buildings.

b. All Other Buildings

- If the average outside dry bulb temperature from 12:01 a.m. to 7:00 a.m. goes below 45 degrees three consecutive days, the heat will be turned on for all the buildings.

OR

- If the average inside dry bulb temperature goes below 60 degrees three consecutive nights the heat will be turned on for all buildings.

c. The temperature readings at strategic locations inside and outside the building should be monitored and documented on a log on a daily basis. This should will be accomplished starting 15 days prior to the date for the start of the heating season. Any sudden temperature drop of 5 degrees below the 68 degree <u>inside</u> standard should be immediately reported to the Facilities Manager day or night in order that appropriate action may be taken. An employee on duty must be designated The utilities operator on duty will be responsible for insuring that temperatures are logged every hour (on the hour) for the time periods stated, and every two hours at other times.

(2) **COOLING**

a. Buildings with Overnight Patients

- If the average outside dry bulb temperature from

12:01 p.m. to 5:00 p.m. rises above 80 degrees three consecutive days, the air conditioning system will be activated.

OR

- If the average inside dry bulb temperature rises above 75 degrees three consecutive nights the air conditioning system will be activated.

b. All other buildings

- If the average outside dry bulb temperature from 12:01 p.m. to 5:00 p.m. rises above 85 degrees three consecutive days, the air conditioning system will be activated.

OR

- If the average inside dry bulb temperature rises above 78 degrees three consecutive nights the air conditioning system will be activated.

The Facilities Manager will monitor temperature readings inside buildings at the nurse stations and outside the building and document the readings in a log. This will be accomplished on a daily basis starting 15 days prior to the date shown above for the start of the heating season. Any sudden temperature increase of 5 degrees above the 75 degree inside standard for cooling is to be immediately reported to the Facilities Manager day or night in order that appropriate action may be taken. The utilities operator on duty will be responsible for insuring that temperatures are logged every hour (on the hour) for the time periods stated, and every two hours at other times.

C. RESPONSIBILITIES

Facilities Manager

(1) Initiates the log on the reading of temperatures for the season.

(2) Consults with the Clinical Director as appropriate to ensure the temperatures maintained inside the building are in the best interest of patient care.

8-5 TEMPERATURE AND HUMIDITY CRITERIA

A. REQUIREMENTS

Each applicable installation will establish a program for the monitoring of temperatures and humidity in the Operating Room suite, Emergency Room, Morgue and Critical Care areas.

Installation will maintain the following temperature/humidity in the designated clinical areas.

	Temperature (^{0}F)	Humidity (%)
Operating Rooms	68/73	45/55
Critical Care Units	70/75	35/60
Morgue Refrigerator	35/40	N/A
Emergency Room	70/75	45/55

B. PROCEDURES

Facilities Manager

(1) Monitor humidity in the various locations. It is recommended that 24-hour graph log recorders be installed in the locations.

(2) Facilities engineering employees will verify temperature and humidity readings in locations weekly if recorders to monitor the temperature and humidity are not installed.

(3) Calibration and/or repairs to equipment will be accomplished immediately.

(4) All documentation for temperature and humidity will be forwarded to the Facilities Manager by Monday for each week.

(5) Consultation with medical and nursing should be conducted whenever the above parameters are modified or affected.

C. RESPONSIBILITIES

Facilities Manager

(1) Ensure preventive maintenance calibration and replacement of charts is accomplished as outlined above.

(2) Ensure documentation is maintained and filled for future accreditation surveys.